



## **WATER RESOURCES RESEARCH GRANT PROPOSAL**

Title: Optimizing Control Strategies for Disinfection By-Products for Small Water Supplies Using Ozone as an Alternative Disinfection Process

Duration: July 1, 1996 to June 30, 1998

Federal Funds RequestedFY 1996:\$39,503

Non-Federal Funds RequestedFY 1996:\$79,316

Principal Investigator:

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and Department of Civil Engineering University of Illinois

Congressional District: 15th

Statement of critical regional or State water problems:

With ever increasing focus on control of drinking water disinfection by-products (DBPs), there has been a shift to alternative disinfection practices including the use of ozone as a substitute for or addendum to drinking water treatment in order to reduce the levels of the regulated DBPs. Because of its relative ease of insertion into treatment trains, ozonation represents a potentially attractive process alternative and has been receiving increasing attention and use in the past several years. This ease of use is particularly attractive for smaller water utilities which suffer from the disadvantages of inverse economy of scale for most alternative processes and the absence of a large consumer base to absorb the high capital investment associated with major process changes required for some of the proposed disinfection process changes such as chloramination.

Small water utilities characterize the service population of the North Central Region of the United States. Primarily an agrarian region, small towns and associated small service populations are typical of the area. These small utilities are now subject to EPA disinfection regulations yet have continuing difficulty with the financial burdens imposed by current and proposed DBP rules. Ozone treatment offers some advantages to such utilities in this regard and it does not produce the chlorinated DBPs. It is understood, of course, that ozone does not provide a residual in the distribution system but there are other procedures that satisfy this requirement while gaining the advantages of ozone use as the primary treatment phase disinfectant. However, ozone is not without potential problems. These are problems that need full evaluation and pertain to all systems using ozone but are especially important to small scale systems where ozone is a potentially attractive means of dealing with the current DBP problems and regulations. These problems relate to the presence of natural organic

matter in all water sources, surface or ground, and the wide spread presence of bromide ion in water sources. Many water sources in the North Central region have sufficient bromide ion content to be of concern and the ramifications of ozone bromide interactions should be understood before costly decisions are made in changes in water treatment procedures.

#### Statement of Results or Benefits:

The research results have immediate application in the decision process for utilities evaluating changes in treatment systems in order to meet increasingly stringent regulation for chemical water quality while balancing the need for better disinfection control in light of recent problems with biological water quality and disease outbreaks. Given the budgetary constraints of small utilities, front end decisions must be made with the best possible information. The results of the proposed research will be transmitted to the users through professional organization, particularly meetings and publications of the American Water Works Association which serves the water supply community.

The research results from this proposed project will feed into and serve as the base for longer term research designed to extend the basic theory of the complex interactions in non chlorine based disinfection of drinking waters. The research results will be applied to generation of strong proposals to the American Water Works Association Research Foundation, the National Science Foundation, and the U.S. EPA. EPA's one area of expected research funding increase in the next several years is in drinking water.